NORTH DAKOTA
DEPARTMENT *of* HEALTH

Health Alert Network

MARCH 4, 2010

HEALTH ADVISORY

Advisory on Antibiotic Resistant Infections from *Klebsiella pneumoniae* Carbapenemase (KPC)-Producing Organisms

The North Dakota Department of Health (NDDoH) is issuing this advisory to provide information and guidance for the recognition and control of infections caused by bacteria that produce *Klebsiella pneumoniae* carbapenemase (KPC), an emerging healthcare-associated group of pathogens. These organisms, also called Carbapenem-Resistant *Enterobacteriaceae* (CRE), produce an enzyme that confers resistance to the carbapenem class of antibiotics as well as other beta-lactam agents including penicillins, cephalosporins, and aztreonam. While first identified in *Klebsiella pneumoniae*, other organisms of the *Enterobacteriaceae* family, such as *Enterobacter spp.* and *E. coli,* have been found to produce this enzyme. Patients at high risk for morbidity and mortality related to these organisms include those with prolonged hospitalization, and those who are critically ill and exposed to invasive devices (e.g. ventilators or central venous catheters).

The North Dakota Department of Health is recommending the following for the identification, reporting, treatment and prevention of KPC-producing organisms.

Identification
All laboratories should be familiar with the current Clinical and Laboratory Standards Institute (CLSI) published recommendations for screening *Enterobacteriaceae* culture results for possible carbapenem resistance and follow-up confirmatory testing using the modified Hodge test (MHT). If MHT is not available, a reference laboratory should be identified and used to confirm carbapenem resistance per CLSI guidelines. The following is a brief outline of the key points for the identification of KPC-producing organisms.

1. Review your facility's capacity to identify KPC-producing organisms from clinical specimens and routinely review microbiology reports for the identification of KPC-producing organisms.
2. Currently, CLSI recommends that any extended-spectrum β-lactamase-producing organisms (ESBL) and/or any other isolate that test intermediate or resistant to all carbapenems should be assumed to be a KPC producer and immediate action should be taken by infection control. No further testing is necessary.
3. If any isolate tests susceptible for carbapenem, but has an MIC in the upper part of the susceptible range such as 2 for ertapenem or 2 or 4 μg/ml for imipenem or meropenem, the isolate should undergo further testing with the MHT. Infection control and the physician should be alerted. If your laboratory or external reference laboratory does not have the capacity to test for KPC- producing organisms and you suspect a patient may be infected or

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colonized with a KPC-producing organism, please contact the North Dakota Department of Health's Division of Laboratory Services at 701.328.6272.

4. If the MHT is positive for an isolate that tests susceptible for carbapenem, but has an MIC at the upper end of the susceptible range for carbapenems, report the carbapenem MIC without an interpretation. Add the comment: "This isolate demonstrates carbapenemase production. The clinical efficacy of the carbapenems has not been established for treating infections caused by *Enterobacteriaceae* that test carbapenem susceptible but demonstrate carbapenemase production in vitro."
5. Maintain a close collaboration among the laboratory, clinicians, infection control and pharmacy departments for exchange of information related to carbapenem antibiotic resistance. Develop a system for immediate notification to the ordering physician and the infection control department of carbapenem-resistant organisms so that appropriate treatment and infection control measures can be ordered.
6. Advise clinicians of the possibility of carbapenem resistance when treating patients with clinical infection due to *Klebsiella spp.* and other *Enterobacteriaceae*. Treatment of infections should be tailored to the isolate's antibiotic susceptibilities. If patients do not respond to initial therapy with a carbapenem, carbapenem resistance should be considered.

Prevention and Control Measures

KPC-producing organisms are considered to be epidemiologically important multi-drug resistant organisms (MDRO) requiring prompt infection control measures.

1. For patients known to be infected or colonized with a KPC-producing organism, please initiate Contact Precautions in addition to standard precautions in place for all patients.

    a. If a private room is not available, cohort patients and staff during clusters of cases of KPC-producing organism colonization and/or infection.

    b. When patients colonized or infected with a KPC-producing organism are to be transferred to another health-care facility, notify the receiving facility of the laboratory result and the need for meticulous adherence to infection control measures, including contact precautions to prevent the transmission of this organism.

    c. Infection with a KPC-producing organism should not be a barrier to transfer to an appropriate care setting.

2. Use antibiotics responsibly. Treatment regimens for all infections should be based on susceptibility test results when available. Empiric therapy should be accompanied by culture and susceptibility testing so that treatment may be adjusted accordingly and therapy stopped when the infection has resolved. Broad-spectrum antibiotics should be avoided when possible.

3. Active surveillance should be initiated upon consultation with the NDDoH. A review of microbiology records for the preceding six to 12 months should be undertaken to identify any previously unknown cases.

More information regarding infection control can be found at www.cdc.gov/mmwr/preview/mmwrhtml/mm5810a4.htm.

Reporting
The NDDoH is requesting that cases of KPC-producing organisms be reported to the Division of Disease Control (telephone number. 701.328.2378 or toll-free 800.472.2180) and that a specimen be submitted to the Division of Laboratory Services (telephone number 701.328.6272). For more information, visit www.ndhealth.gov/disease.

Categories of Health Alert messages:

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- *Health Advisory provides important information for a specific incident or situation; may not require immediate action.*
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This message is being sent to local public health units, clinics, hospitals, physicians, tribal health, North Dakota Nurses Association, North Dakota Long Term Care Association, North Dakota Healthcare Association, North Dakota Medical Association, and hospital public information officers.